

REMARKS

SUMMARY OF THE AMENDMENTS

AMENDMENTS TO THE SPECIFICATION

Paragraph 17: The amendment corrects the spelling of “repellents” in the last sentence.

Paragraph 42: The amendment omits the inadvertent capitalization of the word “component” in the last sentence.

Paragraph 48: The amendment corrects an inadvertent omission that clarifies the type of image that is presented in Figure 2B.

Paragraph 102: The amendments omit the definite article “a” from generic figure elements and corrects a reference to Fig. 3B (*not 2B*).

Paragraph 103: The amendments omit the definite article “a” from generic figure elements and corrects a reference to Fig. 4B (*not 3B*).

Paragraph 115: The amendment omits the definite article “a” from a generic figure element in the first sentence.

Paragraph 123: The amendments correct minor grammatical and reference errors in the last sentence.

Paragraph 128: The amendment corrects minor punctuation, subject-verb agreement, and removes the indefinite “or.”

Paragraph 144: The amendments replace “direct user” with “manual” as the proper alternative to “automated;” omit the definite article “the” in reference to multiple figure elements; and add two inadvertently missing commas.

Paragraph 148: The amendments delete a parenthetical expression and omit the definite article “a” from generic figure elements.

AMENDMENTS TO THE CLAIMS

Claim 1: Support for an “an interconnected network of associated structural elements selected from among: aligned cylinders; columns; reticulated spaces; struts; as well as combinations of any of the foregoing” may be found in the specification as originally filed at paragraphs 85 and 86. Support for “at least one opening” for the release of vapor “at a velocity greater than zero” may be found in the specification as originally filed at paragraph 32.

Claim 4: Support for the heat transfer component further comprising vapor collections formed by “fins, posts and curved spirals” may be found in the specification at paragraphs 37, 39, 101, 111, 112, *et al.*

Claim 5: Support for the amendments may be found in the specification as originally filed at Figures 4A, 4B and paragraph 103.

Claim 6: The amendment adds a missing preposition.

Claim 7: Support for the amendments may be found in the specification as originally filed at Figures 3A, 3B and paragraph 102.

Claim 8: The amendment adds a missing preposition.

Claim 9: Support for the amendment may be found in the specification as originally filed at paragraphs 17, 21, 41, 42, 60, 98, 119, 122, 123, 126, 138 and 145.

Claim 10: Support for the amendments may be found in the specification as originally filed at paragraphs 17, 115, 119, 126, 138 and 145.

Claim 11: Support for “treatment element” may be found in the specification as

originally filed at paragraphs 60 and 119; “its” refers to vapor and is a grammatical change.

Claim 12: Support for the amendments may be found in the specification as originally filed at paragraphs 41, 42, 98, 99 and 119.

Claim 13: A spelling error is corrected; support for the amendments may be found in the specification as originally filed at paragraphs 17, 64 and 147.

Claim 15: Deletes superfluous language; support may be found in the specification as originally filed at paragraphs 42, 53, 75, 109, 110, 120 and 122.

Claim 19: Support for “pump array” may be found in the specification as originally filed at paragraphs 144 and 148-150.

Claim 21: Amended for consistency with newly amended Claim 19; additional support may be found in the specification as originally filed at paragraphs 62, 144, 148 and Figure 11.

Claim 22: Amended for consistency with newly amended Claim 19; additional support may be found in the specification as originally filed at paragraphs 144 and 148.

Claim 23: Made dependent on dependent Claim 22 and amended for consistency with newly amended Claim 19; additional support may be found in the specification as originally filed at paragraphs 144 and 148.

Claim 24: Amended for consistency with newly amended Claim 19; additional support may be found in the specification as originally filed at paragraph 75.

Claim 25: Amended for consistency with newly amended Claim 19; additional support may be found in the specification as originally filed at paragraphs 144 and 149.

Claim 29: Made dependent on independent Claim 1; additional support may be found in

the specification as originally filed at paragraphs 40, 120 and 122.

None of the foregoing amendments to the Specification or Claims expand the scope of the invention or add new matter to the specification. Entry of the requested amendments and favorable consideration of the comments contain herein are now requested.

Applicants now address each of the Examiner's objections in turn.

**FIRST OBJECTION FOR NONSTATUTORY
OBVIOUSNESS-TYPE DOUBLE PATENTING**

In paragraph three on page two of the Office Action dated 17 October 2006, the Examiner rejected Claims 1-4, 9-12, 14-17, 19 and 26-29 as being unpatentable over Claims 1-3, 10, 16-18, 25 and 28 of U.S. Pat. No. 6,634,864 (the '864 patent). The '864 patent is owned in common by the owner of the current application.

Applicants have herein amended Claims 1, 4, 9-12 and 15, and have cancelled Claims 2, 3, 14, 17, 19 and 26-29. Applicants maintain that as newly amended, Claims 1, 2, 4, 9, 12 and 15 distinguish over Claims 1-3, 10, 16-18, 25 and 28 of the '864 patent.

The Examiner stated that the term "component" of Claims 1 and 26 of the application is broader and used in the same context as "layer" in Claims 1 and 16 of the '864 patent. Applicants point out that the term "layer" is not appropriate for use with several alternate embodiments illustrated, for example, at Figures 3A, 3B, 4A, 4B. Claim 26 having been cancelled, Applicants maintain that newly amended Claim 1 does distinguish over Claims 1 and 126 of the '864 patent.

The Examiner objected to the term "capillary network" in Claims 1 and 26. Claim 26 has been deleted; Claim 1 has been amended. The term "capillary network" term has been deleted in the claims and replaced with "an interconnected network of associated structural elements selected from among: aligned cylinders; columns; reticulated spaces; struts; as well as combinations of any of the foregoing" for which support in the specification as originally filed

has been indicated above.

The Examiner objected to “non-uniform struts” and “a series of aligned channels.” Applicants maintain that these features are not the same and thus are *not* interchangeable with “multiple posts” and “pores and channels.” The struts, columns, reticulated spaces, aligned cylinders, etc., pertain to the *microscopic* structures and networks that characterize the vaporizer component microstructure in the present invention. Note that paragraph 2B refers to an “alternative *microstructure*” (emphasis added). On the other hand, the posts, pores and channels that are discussed in the specification pertain to the *macroscopic* morphology for alternate heater components according to different embodiments of the present invention, examples of which are illustrated in Figures 6A, 6B and 6C.

Claim 14 having been cancelled, the objection to the term “seal” is now rendered moot.

Claim 16 has been cancelled; Claims 9 and 12 are herein amended. Applicants maintain that the objection to the phrase “liquid treatment component” is now rendered moot in light of the foregoing amendments.

Claims 14 and 26 having been cancelled, the objections based on these claims are now rendered moot.

Claims 19 and 23 are herein amended. Applicants maintain that the objections to Claims 19 and 23 as amended in light of newly amended Claim 1 are now moot.

Claims 12 and 21 are herein amended. Applicants maintain that the objection to newly amended Claim 21 regarding heating of the device is now moot in light of newly amended Claim 12.

In light of the foregoing comments, Applicants respectfully request withdrawal of the objections to Claims 1-4, 9-12, 14-17, 19 and 26-29 based on obviousness-type double patenting. Applicants maintain that the claims as herein amended are in position for allowance, and

reconsideration towards that goal is respectfully requested.

SECOND OBJECTION FOR NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

In the Office Action dated 17 October 2006, the Examiner rejected Claim 20 as being unpatentable over Claim 1 of U.S. Pat. No. 6,634,846 in paragraph four on page four. The '864 patent is owned in common by the owner of the current application.

Claim 20 has been cancelled herein. Accordingly, the foregoing rejection is now rendered moot and should be withdrawn. Withdrawal of the rejection of Claim 20 and further consideration of the specification and claims is therefore urged at this time.

THIRD OBJECTION FOR NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

On page five of the Office Action dated 17 October 2006, in paragraph five, the Examiner objected to Claim 22 as being unpatentable over Claim 1 of U.S. Pat. No. 6,634,864. The Examiner stated that the '864 patent: "discloses the claimed invention except for a separate supply source provided to feed liquid into each device." The '864 patent is owned in common by the owner of the current application.

Claim 22 is dependent on dependent Claim 19, which in turn is dependent on independent Claim 1. Claims 1 and 19 having been amended herein, Applicants maintain that newly amended Claim 22 is now distinct over Claim 1 of the '864 patent.

Having amended Claim 22, and Claims 1 and 19, upon which Claim 22 is dependent, Applicants maintain that the objection to Claim 22 based on obviousness-type double patenting is now moot and should be withdrawn. The Office is therefore encouraged to withdraw the objection to Claim 22 and favorably consider the specification and claims towards allowance.

FOURTH OBJECTION FOR NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

In the Office Action dated 17 October 2006, at page five in paragraph six, the Examiner objected to Claims 13 and 18 as being unpatentable over Claim 1 of U.S. Pat. No. 6,634,864 in view of Wilkinson (U.S. Pat. No. 345). The '864 patent is owned in common by the owner of the

current application.

In paragraph six of the Office Action, the Examiner admitted that “the ‘864 patent discloses all the limitations substantially as claimed except for an internal combustion engine or a microturbine arranged to receive vapor output.” The Examiner further stated that Wilkinson teaches: “a gasoline fuel vaporization system...that includes a vaporization chamber...a housing...and a fuel line.” The Examiner further stated that: “it would have been obvious to...modify the capillary pump” of the ‘864 patent “to receive vapor output, as taught by Wilkinson, in order to increase the exposure of the fuel in the fuel air mixture so as to allow for complete combustion and utilization of fuel.” Applicants respectfully disagree with the Examiner for the following reasons.

As Claim 18 is cancelled herein, the objection to Claim 18 is now moot. Claim 1, on which Claim 13 depends, recites a *capillary* device and has been amended to recite the limitations of an interconnected network of aligned cylindrical structures and the release of vapor at a velocity greater than zero. Neither the ‘864 patent nor Wilkinson disclose or claim any similar limitations.

Wilkinson does not concern capillary devices, but instead is directed to the vaporization and delivery of gasoline in internal combustion engines. The invention concerns heating a tubular length of metal having *an* inlet to receive liquid gasoline fuel and *an* outlet for delivering vaporized fuel to an internal combustion engine. The gasoline fuel in Wilkinson must be *pumped*; it is not drawn to the vaporization chamber by capillary forces. There is nothing in Wilkinson, therefore, to suggest the use of capillary forces for moving the gasoline fuel to feed the elongate vaporization chamber. Nor is there any teaching or suggestion in Wilkinson regarding the use of a capillary device. Capillary devices have multiple inlet and output channels, and not *an* in let and outlet. Furthermore, Wilkinson neither suggests nor teaches an interconnected network of aligned cylindrical structures, nor a capillary device that releases vapor at a velocity greater than zero. Arguably, therefore, there is no motivation in Wilkinson to suggest combining his technology with that of the ‘864 patent.

In light of the foregoing, Applicants maintain that the objections to Claims 13 and 18 based on the '864 patent in light of Wilkinson are now moot. Withdrawal of the objections to Claims 13 and 18 and further consideration of the claims on the merits is now requested.

**FIFTH OBJECTION FOR NONSTATUTORY
OBVIOUSNESS-TYPE DOUBLE PATENTING**

On page six of the Office Action dated 17 October 2006, in paragraph seven, the Examiner objected to Claim 24 for obviousness-type double patenting over Claim 1 of U.S. Pat. No. 6,634,864 in view of Harvey (U.S. Pat. No. 4,937,053). The '864 patent is owned in common by the owner of the current application.

In his reasons for objection, the Examiner admitted that the '864 patent "discloses all the limitations substantially as claimed except for having a heater component capable of melting a solid feed to form the liquid feed in the supply source." The Examiner further stated that Harvey "teaches a crystal growing apparatus including a crucible die assembly." The Examiner further stated that: "it would have been obvious...to modify the ['864] capillary pump...by having a heater component capable of melting a solid feed to form the liquid in the supply source...in order to get the source material in the needed liquid form to allow for the growth of a crystalline body." With all due respect to the Examiner, the objection is in error and should be withdrawn.

Harvey is directed to a furnace for growing crystalline bodies. The furnace includes a crucible-die assembly situated on an interior gas manifold plate. An exterior gas manifold plate is also present. Inert or reactive gases are sent through the interior or exterior gas manifolds as desired to alternately purge or react with a melt in the growth zone of the chamber. Harvey is thus concerned with using substances *already* in gaseous or vapor form to aid in the growth of a crystal from a melt.

Claim 24 is dependent on dependent Claim 19, which in turn is dependent on independent Claim 1. Each of Claims 1, 19 and 24 are herein amended. As newly amended, Claim 24 recites an array of capillary devices, each including a vaporizer component characterized by an interconnected network of aligned cylindrical structures that releases vapor

at a velocity greater than zero. There is nothing in Harvey to suggest the use of a capillary device, nor an interconnected network of aligned cylindrical structures, nor a device that releases vapor at a velocity greater than zero. Applicants maintain that it would therefore not have been obvious to combine the teaching of Harvey with the '864 patent in order to arrive at Applicants' invention.

The rejection for nonstatutory obviousness-type double patenting based on Claim 1 of the '864 patent in light of Harvey is therefore in error and should be withdrawn. Withdrawal of the objection to Claim 24 as amended and further consideration of the specification and claims in light of the amendments and discussions presented herein is now respectfully urged.

SIXTH OBJECTION FOR NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

In the Office Action dated 17 October 2006, in paragraph eight on page seven, the Examiner objected to Claim 25 for obviousness-type double patenting over Claim 1 of U.S. Pat. No. 6,634,864 in view of Schladitz (U.S. Pat. No. 3,869,242). The '864 patent is owned in common by the owner of the current application.

The Examiner stated that the '864 patent discloses all the limitations substantially as claimed, except for a common vapor chamber, and that Schladitz teaches a process for vaporizing fuel oil. The Examiner further stated that: "it would have been obvious...to modify the ['864 capillary pump]...by adding a vapor chamber to receive vapor released from a device...in order to allow for the direction of vapor into a mixing chamber so it can be mixed with air and moved to a combustion chamber." With all due respect, Applicants maintain that the Examiner is in error.

Dependent Claim 25 is dependent on dependent Claim 19, which in turn is dependent on independent Claim 1. Claims 1, 19 and 25 have all been amended herein. Neither the '864 patent nor Schladitz teach or claim a capillary device comprising a vaporizer component characterized by an interconnected network of aligned cylindrical structures for releasing vapor at a velocity greater than zero. Schladitz concerns boiler for vaporizing fuel oil that contains

polycrystalline metal whiskers on the order of several centimeters in length. Furthermore, the fuel oil in Schladitz must be pumped into the heating element. The fuel is not introduced by capillary forces as is the liquid feed in the present invention. Applicants maintain that it would therefore not have been obvious to combine the teaching of Schladitz to modify the '864 patent in order to arrive at Applicants' invention.

In light of the foregoing, Applicants maintain that the objection to Claim 25 for double patenting based on the '864 patent in view of Schladitz is therefore in error and should be withdrawn. Withdrawal of the objection to claim 25 and further consideration of the specification and claims is therefore now requested.

ALLOWABLE SUBJECT MATTER

On page eight of the Office Action mailed 17 October 2006, at paragraph nine, the Examiner stated that: "Claims 5-8 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."

Applicants have herein amended and rewritten Claims 5-8 in a manner consistent with the Examiner's comments and present Claims 5-8 for reconsideration for allowance. Entry of the requested amendments and review of Claims 5-8 in light of the amendments is therefore respectfully requested. Applicants maintain that re-presented Claims 5-8 are now in position for allowance and action towards allowance of these claims is now respectfully requested.

In light of the foregoing discussions, Applicants request entry of the amendments to the specification and claims requested above, and urge reconsideration of the resulting application.

CONCLUSION

Paragraphs 17, 42, 102, 103, 115, 123, 128, 144 and 148 are amended in the specification. Claims 1-29 are pending in the application. Claims 2, 3, 14, 16-18, 20 and 26-29 are cancelled; Claims 1, 4-13, 15, 19 and 21-25 are amended; and new Claims 30-32 are added.

The Examiner's rejections of Claims 1, 2, 4, 9-13, 15, 19 and 21-25 on the ground of nonstatutory obviousness type double patenting over U.S. Pat. No. 6,634,864 either alone or variously in combination with Wilkinson (U.S. Pat. No. 4,325,345), Harvey (U.S. Pat. No. 4,937,053) or Schladitz (U.S. Pat. No. 3,869,242) have been overcome. Withdrawal of these rejections is therefore respectfully urged.

Claims 5-8 have been rewritten in independent form, in a manner consistent with the Examiner's criteria for allowance. Movement of Claims 5-8 to allowance is therefore respectfully urged.

Claims 1, 4-13, 15, 19, 21-25 and 30-32 define novel and non-obvious subject matter of the present invention. In view of the foregoing Amendments and remarks, it is respectfully submitted that the Claims now presented herein are patentable over the art of record, and that this application is now in condition for allowance. Such favorable action is earnestly solicited. If the next action is other than to allow the claims, the undersigned requests the favor of a short telephonic interview.

Respectfully submitted,



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